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CPRE 489: Lab 9

What I learned:

To start, I learned how to create a topology in GENI by hand, without having to use a pre-made setup. This helps me understand and make my own connections to perform whatever kind of test I would need to do. Another thing I learned was about TCP congestion avoidance algorithm, and how it is used to handle TCP traffic. There are many aspects to this algorithm such as the slow start threshold, congestion avoidance window, fast recovery, and fast response. These all come together to create a more consistent way to transmit packets quickly.

Another thing I learned (or already knew and had to struggle through) was creating a legible graph in excel. Whenever I imported the .dat file and tried to create graphs, they came out nasty. It definitely took some time and some google searching to find ways to make the graphs legible.

Exercise:

Screenshot of topology

A picture containing diagram

Description automatically generated

Screenshots of IPERF on PROBE output (I only included the last chunk of probe, otherwise it would take a few pages):

Graphical user interface

Description automatically generatedA picture containing text, electronics, computer

Description automatically generated

Graphs with annotations:

Slow Start vs. Congestion avoidance:

In slow start mode, the number of transmissions is exponential until it reaches the slow start threshold. Once this is reached, congestion avoidance starts, where the number of transmissions increases linearly. So basically, slow start sends packets slowly and then really ramps up, where as congestion avoidance sends them slowly to avoid going past the threshold.

When 3 duplicate ACKS are received:

When this happens, the slow start threshold is set to the current congestion avoidance window, and the current congestion avoidance window is reduced by half. Slow start and congestion avoidance then start again until the threshold is reached.